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ABSTRACT

The psychometric integrity of a measure of ecological stress in families with children who are handicapped was investigated using bootstrap factor analytic logic and the FACSTRAP program. The instrument is known as the Questionnaire on Resources and Stress--Friedrich short form. Subjects included both parents (N=132) in each of 66 intact families. The mean number of children in the families was 1.9, and the average age of the 66 target preschoolers was 24 months. Half of the families included children with handicaps who were enrolled in early childhood intervention programs due to conditions that either put them at established risk or high risk for a handicapping condition. Three series of 100 factor analyses of random samples of different configurations of the subjects (100, 200, and 600) were conducted. The results generally suggest that the questionnaire is valid. Factor structures were fairly comparable across bootstrap analyses. Four scales appear to be latent within the questionnaire response data. Most of the items appear to have been correctly identified as being associated with expected scales. Five data tables conclude the document. (TJH)

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BOOTSTRAP FACTOR ANALYSIS:

DESCRIPTION AND AN ILLUSTRATIVE EXAMPLE

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Paper presented at the annual meeting of the Mid-South Educational Research Association, Louisville, KY, November 9, 1988.

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ABSTRACT

The psychometric integrity of a measure of ecological stress in families with children who are handicapped, the Questionnaire on Resources and Stress--Friedrich short form, was investigated using boostrap factor analytic logic. Three series of 100 factor analyses of random samples of different configurations of subjects (100, 200, or 600) were conducted. Results were generally supportive of a conclusion that the QRS-F is reasonably valid.

Practitioners and researchers have become increasingly interested in interventions designed to assist exceptional children, especially since the enactment of federal legislation embodied in P.L. 94-142 and P.L. 99-457. But numerous researchers (cf. Brooks-Gunn and Lewis, 1983; Shonkoff, 1983; Weatherford, 1986) have enumerated serious shortcomings in the use of traditional standardized tests as the sole indicators of intervention effects. Researchers have also increasingly recognized that child and family dynamics are interrelated and that changes in one reverbate in the other (Bronfenbrenner, 1977, 1986; Crnic, Friedrich and Greenberg, 1983).

Researchers have recognized too that parenting children with handicaps results in significant amounts of unique familial stress (Blacher, 1984; Farran, Metzger and Sparling, 1986; Fewell, 1986). Taking this fact into account, Guralnick and Bennett (1987) argued that there is a critical need to develop and improve instruments to assess selected familial stessors in families in which children with handicaps are members. Salisbury (in press) also supports this view, noting that

> Over the past decade there has been a marked increase in research and program development efforts related to families and their handicapped children. Evaluation of these efforts, in both clinical and applied settings, requires the use of efficient and effective measures of family functioning.

A number of measures that purport to evaluate stress in families already exist (cf. Dunst and Trivette, 1985). But, as

Wikler (1986) noted, the one instrument most frequently used to measure stress in families containing children with handicaps is the Questionnaire on Resources and Stress (QRS) developed by Holroyd (1974). The measure has promising psychometric properties, but the use of 285 items requires so much administration time that various short forms have been empirically derived (e.g., Salisbury, 1985, 1986). However, the short form (QRS-F) developed by Friedrich, Greenberg and Crnic, 1983) appears to be especially promising (Fewell, 1986).

The purpose of the present study was to investigate the structure underlying responses to the QRS-F. Structure studies are often useful in evaluating the construct validity of measures. Indeed, Nunnally (1978, p. 111) has even referred to construct validity as "factorial validity" and notes that "factor analysis is intimately involved with questions of validity" (p. 112).

Subjects

The subjects (n=132) were both parents in each of 66 intact families. The average age of the 66 target preschoolers in the study was 24.0 months (SD = 12.6). Seventy-four (56%) of the children were female. The mean number of children in the 66 families was 1.9 (SD = 1.2).

Thirty-three of the families included children with handicaps who were enrolled in early childhood intervention programs because they manifested conditions that either put them at established risk (e.g., Down syndrome) or high risk (e.g., developmental delay) for a handicapping condition. Early

childhood intervention programs typically employ the "generic" classification for young children.

Structure studies in this area of inquiry often use both families including children with handicaps and families not including such children (e.g., Salisbury, 1985, 1986). One useful feature of such a sampling strategy is that response variance is maximized such that more stable and generalizable factor structures should be isolated.

The average age of the 132 parents was 31.6 (SD = 5.1). The average number of grades of education completed by the parents was 15.0 (SD = 2.7). The average income in the 66 families was $33,625 (SD = $18,632).

Results

An important unique feature of the present study involved the use of bootstrap factor analysis (Thompson, 1988). Conventional factor analytic procedures typically capitalize on both measurement and sampling error. As Gorsuch (1983, p. 330) emphasizes:

> In factor analysis, one has numerous possibilities for capitalizing on chance. Most extraction procedures, including principal factor solutions, reach their criterion by such capitalization. The same is true for rotational procedures, including those that rotate for simple structure.

These influences are illustrated, for example, in the eigenvalues that researchers typically consult to facilitate decisions regarding the number of factors to be extracted. Yet

sample results are influenced by sampling error. Thus, in her study of familial stressors perceived by 189 parents, some with children who were handicapped, Salisbury (1986) reported prerotation eigenvalues for her first several principal components of: 11.2, 7.5, and 6.5. In a subsequent analysis involving data provided by 103 mothers of a child with developmental disability, Salisbury (in press) reported the prerotation eigenvalue for the first principal component was 6.05.

Researchers can employ any of several logics to estimate how much sampling error is influencing results. First, researchers can divide their data, conduct two separate analyses, and then rotate factor solutions to positions of "best fit" to determine whether results appear to be grossly influenced by sample characteristics. Thompson (1986) provides a test distribution for such results.

Second, researchers can use the "jackknife" logic attributed to Tukey and repetitively conduct analyses dropping a different subject or set of subjects each time. Crask and Perreault (1977) provide a readable explanation of this logic in a related analytic case.

Third, researchers can employ the "bootstrap" logic developed by Efron and his colleagues. This logic involves copying data sets over and over again into a large data file, and then repetitively drawing random samples from this large data file such that many different solutions are isolated using many different configurations of subjects. Diaconis and Efron (1983)

provide an accessible explanation of this analytic logic.

The present study employed a bootstrap logic, using the FACSTRAP program described by Thompson (1988), to analyze data intially examined with less sophisticated methods by Sexton, Scott and Thompson (1988). The results in the initial inquiry serve as a baseline for interpreting the bootstrap results reported here. In the present study, three separate sequences of analyses, each involving 100 random samples, were conducted for each of three different sample sizes: n = 100; n = 200; and n = 600. Each analysis used a principal components analysis in which sample results were rotated to "best fit" with a target matrix of zeroes and negative and positive ones corresponding to the theoretically expected matrix derived from the sample results for 132 parents. The rotation of all results into a common factor space allows the comparison of factors across solutions and the computation of average structure coefficients across samples within each sequence of analyses.

An important decision in any factor analysis involves the number of factors to extract. Some researchers routinely follow Guttman's eigenvalues-greater-than-one rule and extract all principal components with eigenvalues greater than 1.0. However, other researchers apply Cattell's "scree" test and stop extracting factors at the point where prerotation eigenvalues begin to "level off." In both cases, decisions grounded in the examination of eigenvalues presume that eigenvalue estimates are stable.

An important advantage of bootstrap factor analysis is that the procedure can be employed to evaluate the stability of

eigenvalues across samples. Table 1 presents the mean eigenvalues for the first six prerotation eigenvalues in each of three bootstrap sequences. The table also presents the standard deviations about these mean estimates. Finally, the table presents the mean change in eigenvalues for each additional factor and the standard deviations of these changes. These changes can be consulted to isolate factor "scree" or "levelling off."

INSERT TABLE 1 ABOUT HERE.

Table 2 presents the mean structure coefficients for the three sequences of boostrap estimates, and the standard deviations for these estimates. The table also presents the structure coefficients derived by Sexton et al. (1988) for a non-bootstrap solution employing principal components extraction and rotation to the varimax criterion.

INSERT TABLE 2 ABOUT HERE.

Discussion

The Table 1 results indicate that advocates of Guttman's eigenvalue-greater-than-one rule would extract more than six principal components from the correlation matrix. However, the eigenvalue change or "scree" values reported in Table 1 suggest that the eigenvalues begin "levelling off" after the fourth eigenvalue. This pattern is more characteristic of bootstrap results involving 100 samples each of 200 and 600 subjects, and involves the mean change in the fourth prerotation eigenvalue

becoming smaller than was the case for 100 samples of 100 subjects (0.68 vs. 0.58 vs. 0.58) and the fifth prerotation eigenvalue change becoming larger (0.38 vs. 0.41 vs. 0.41).

This result suggests that four principal components may reasonably be extracted to characterize responses on the Questionnaire on Resources and Stress--Friedrich short form (QRS-F). The conclusion is supported by alpha reliability coefficients (0.84, 0.83, 0.85, 0.77) derived by applying the Friedrich et al. (1983) scoring keys to these data (Sexton et al., 1988). These reliability coefficients indicate that unique aggregations of items yield internally consistent scores for four scales.

The factor structures summarized in Table 2 were fairly comparable across bootstrap analyses. Not surprisingly, the standard deviations of the estimated structure coefficients, akin to standard errors, tended to be smaller (a) when mean structure coefficients were larger, (b) when sample size in a bootstrap sequence was larger, or (c) when factor position in factor space was more restricted by more items defining a factor.

As designated with asterisks in Table 2, 14 of the 52 items had structure coefficients greater in absolute value 0.30 with two factors. Two "doublet" items (12 and 42) were not correlated with expected factors. Of the remaining 12 "doublet" items, five items (6, 26, 33, 44, and 51) were correlated with two factors, including the expected factor, but were more associated with a factor other than the expected factor. The final set of seven of these 14 items (1, 8, 28, 30, 37, 46, and 48) were associated with two factors, but were primarily correlated with the expected factor. Three items (3, 27, and 35) do not appear to be

appreciably correlated with any of the four factors.

The factor structures reported in Table 2 are similar to the structure previously reported by Friedrich et al. (1983). Factor I in the present study corresponds to their second factor, "Pessimism." However, several items that measured the Friedrich et al. (1983) first factor were also associated with Factor I in the present study. These items tend to involve affect, and it is therefore suggested that Factor I in the present study might better be named "Pessimism with Affect" or "Parent Affect."

Factor II in the present study corresponds with the first factor isolated by Friedrich et al. (1983), except that more affective items tended in the present study to be associated with our Factor I. Friedrich et al. (1983) named the factor corresponding to Factor II, "Parent and Family Problems."

Factor III in the present study matches pretty closely the third factor that Friedrich et al. (1983) named "Child Characteristics." Factor IV in the present study corresponds to the factor that previously was named "Physical Incapacitation." However, several types of incapacitation not involving physical functioning were also associated with this factor, which might therefore more appropriately be labelled simply "Child Incapacitation."

In summary, the results of the present study are generally supportive of a conclusion that the Questionnaire on Resources and Stress--Friedrich form (QRS-F) (Friedrich et al., 1983) has reasonable psychomteric integrity. Four scales appear to be latent within QRS-F response data. Most of the items appear to

have been correctly identified as being associated with expected scales. It is encouraging that similar results have been derived across analytic methods and various bootstrap samples sizes. The QRS-F appears to be a valid measure of an important construct.

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Table 1
Descriptive Statistics for First Six Eigenvalues for 100 Samples Involving Three Sample Sizes

Sample n/ Statistic	I	II	III	IV	V	VI
n=100						
Eigenvalue						
Mean	11.43	5.57	3.57	2.89	2.51	2.22
SD	1.21	.55	.32	.24	.18	.14
Scree						
Mean	11.43	5.85	2.00	.68	.38	.29
SD	1.21	1.42	.63	.36	.23	.14
n=200						
Eigenvalue						
Mean	11.23	5.07	3.30	2.73	2.32	2.08
SD	1.04	.40	.22	.21	.14	.12
Scree						
Mean	11.23	6.17	1.76	.58	.41	.24
SD	1.04	1.08	.48	.26	.20	.13
n=600						
Eigenvalue						
Mean	10.98	4.96	3.13	2.55	2.13	1.94
SD	.58	.24	.13	.13	.10	.07
Scree						
Mean	10.98	6.02	1.83	.58	.41	.19
SD	.58	.63	.26	.17	.15	.11

Table 2
Factor Structures Across Three Analyses

Factor/ No.	Key	Item	Core	n 100	200	600	132
Factor I							
43	T	2	Worry happen when I can no longer care	.77	.80	.82	.82
				(.06	.05	.02)	
04	T	2	Worry happen to ___ when I no take care	.68	.71	.72	.72
				(.07	.05	.02)	
13	T	2	Bothers me that ___ always be this way	.67	.68	.70	.70
				(.09	.07	.03)	
32	T	2	I worry what done with ___ when older	.64	.65	.66	.66
				(.11	.06	.04)	
28*	T	2	Disappointed ___ not lead normal life	.61	.62	.64	.64
				(.11	.08	.04)	
06*	T	3	___ is limited in work to make a living	.58	.61	.63	.63
				(.10	.07	.04)	
25	T	2	___ is over-protected	.57	.60	.61	.61
				(.11	.07	.04)	
22	T	2	___ doesn't do as much should be able	.57	.58	.58	.58
				(.11	.07	.04)	
33*	T	1	I get almost too tired to enjoy myself	.53	.56	.57	.56
				(.11	.06	.04)	
50	F	1	I rarely feel blue	.52	.55	.55	.53
				(.13	.09	.05)	
51*	T	1	I am worried much of the time	.46	.46	.46	.45
				(.11	.08	.05)	
42*	T	1	I feel sad when I think of	.45	.46	.47	.45
				(.12	.08	.05)	
20	T	1	I get upset with way my life is going	.43	.43	.43	.41
				(.11	.08	.05)	
37*	T	3	___ cannot remember what says	.31	.30	.29	--
				(.14	.10	.06)	
12*	T	1	Family's social life will suffer	.31	.34	.34	.35
				(.15	.10	.06)	
Factor II							
40	T	1	Demands to care for ___ limit my growth	.77	.78	.78	.78
				(.06	.04	.02)	
14	T	3	I feel tense when take out in public	.74	.72	.72	.71
				(.09	.08	.05)	
11	T	3	Sometimes avoid taking out in public	.70	.70	.71	.71
				(.10	.07	.03)	
16	T	1	Taking ___ on vacation spoils pleasure	.68	.61	.64	.64
				(.13	.12	.06)	
45	T	1	Caring for ___ puts a strain on me	.61	.63	.63	.64
				(.10	.06	.03)	
05	T	1	Demands limit growth else in our family	.60	.59	.59	.58
				(.12	.09	.05)	
24	F	1	Many places enjoy selves as family with	.59	.57	.57	.55
				(.13	.10	.05)	
46*	F	1	Family do same things other families do	.57	.54	.55	.54
				(.14	.11	.06)	

18	F	1	Family does as many things as ever did	.51	.47	.50	.50
				(.13	.11	.06)	
09	T	1	I have given up things really wanted	.50	.52	.52	.53
				(.09	.06	.03)	
15	F	1	I can go visit friends whenever I want	.46	.44	.46	.46
				(.12	.10	.06)	
02	T	1	Other family members do without because	.46	.48	.48	.49
				(.12	.08	.05)	
21	T	3	Sometimes I feel embarrassed becuase of	.40	.39	.41	.39
				(.23	.15	.09)	
33*	T	1	I get almost too tired to enjoy myself	.37	.38	.38	.39
				(.08	.05	.03)	
31	F	1	It is easy for me to relax	.36	.35	.35	.37
				(.11	.09	.05)	
51*	T	1	I am worried much of the time	.32	.29	.31	.31
				(.12	.10	.05)	
30*	T	3	___ can't pay attention very long	.31	.30	.31	.32
				(.09	.07	.04)	
Factor III							
39	F	3	It is easy to communicate with ___	.64	.70	.72	.72
				(.10	.07	.05)	
23	T	3	___ has difficulty understanding	.58	.64	.66	.66
				(.13	.09	.06)	
01*	T	3	Doesn't communicate with others of age	.58	.56	.57	.56
				(.13	.10	.06)	
19	F	3	___ aware who he/she is	.56	.58	.59	.60
				(.13	.10	.06)	
48*	F	3	___ is able express his/her feelings	.55	.56	.57	.56
				(.15	.11	.06)	
41	F	3	___ accepts self as a person	.55	.55	.59	.58
				(.16	.15	.08)	
34	F	3	Appreciate about ___ is confidence	.47	.50	.54	.54
				(.18	.13	.06)	
26*	F	4	Is able take part games or sports	.46	.44	.43	.42
				(.12	.10	.06)	
10	F	1	___ able fit into family social group	.45	.45	.47	.50
				(.19	.12	.06)	
37*	T	3	___ cannot remember what says	.44	.51	.52	.51
				(.16	.10	.08)	
29	T	2	Time drags for, especially free time	.38	.42	.42	.47
				(.21	.15	.11)	
44*	T	3	People can't understand tries to say	.38	.37	.38	.34
				(.13	.11	.06)	
08*	F	4	___ can feed self	.37	.35	.34	--
				(.14	.08	.06)	
47	T	2	___ will always be a problem for us	.37	.42	.42	.47
				(.25	.18	.12)	
42*	T	1	I feel sad when I think of	.37	.40	.40	.44
				(.18	.11	.08)	
06*	T	3	___ is limited in work to make a living	.34	.29	.29	--
				(.11	.09	.06)	
07	T	2	Accepted might live life special setting	.34	.36	.35	.36
				(.16	.13	.07)	

28*	T	2	Disappointed ___ not lead normal life	.34	.33	.34	.36
				(.12	.12	.07)	
30*	T	3	___ can't pay attention very long	.34	.35	.34	.32
				(.11	.10	.05)	
46*	F	1	Family do same things other families do	.31	.34	.34	.38
				(.15	.12	.06)	
Factor IV							
36	F	4	___ is able go bathroom alone	.60	.63	.66	.70
				(.13	.12	.06)	
49	T	4	___ has to use a bedpan or a diaper	.56	.61	.65	.69
				(.16	.11	.07)	
08*	F	4	___ can feed self	.56	.58	.61	.63
				(.13	.08	.06)	
52	F	4	___ can walk without help	.54	.57	.61	.62
				(.14	.10	.06)	
17	F	3	___ knows own address	.53	.57	.62	.66
				(.14	.14	.06)	
26*	F	4	Is able take part games or sports	.42	.44	.45	.48
				(.13	.10	.06)	
44*	T	3	People can't understand tries to say	.41	.40	.40	.44
				(.14	.11	.07)	
12*	T	1	Family's social life will suffer	.36	.41	.42	.41
				(.22	.14	.11)	
01*	T	3	Doesn't communicate with others of age	.36	.36	.37	.40
				(.14	.09	.05)	
48*	F	3	___ is able express his/her feelings	.33	.32	.32	.35
				(.15	.12	.06)	
38	F	4	___ can ride a bus	.30	.32	.35	.39
				(.19	.16	.10)	

Note. Means of 100 estimates of structure coefficients for various sample sizes are presented in the first three columns. Standard deviations for mean estimates of structure coefficients are presented in parentheses. Results for n=132 are reported by Sexton et al. (1988), and were not derived using boostrap logic. "Key" indicates the scoring direction for each item (True or False) and which of four scales ("1" through "4") each item was associated with in the original development work reported by Friedrich et al. (1983). "Doublet" items that were associated > 0.30 with two factors are designated with asterisks.

APPENDIX A:
Bootstrap Structure for 100 Samples of Size n=100

1	.196	.068	.575	.355
	.130	.116	.126	.136
2	.251	.460	-.033	.201
	.127	.120	.122	.142
3	.002	-.096	.136	-.131
	.181	.071	.176	.185
4	.677	.176	.047	.126
	.073	.067	.114	.137
5	.208	.598	.245	-.115
	.113	.119	.159	.124
6	.582	.006	.344	.297
	.103	.112	.113	.112
7	.265	-.027	.343	.109
	.151	.105	.164	.188
8	-.040	-.165	.373	.558
	.133	.082	.136	.133
9	.073	.497	.037	.116
	.130	.086	.146	.188
10	.022	.117	.451	-.020
	.135	.143	.189	.159
11	.125	.699	-.031	-.088
	.102	.101	.109	.099
12	.311	.127	.028	.356
	.150	.151	.198	.218
13	.672	.048	.233	.088
	.092	.117	.158	.140
14	.088	.736	.074	-.007
	.105	.090	.146	.116
15	.138	.462	.094	-.101
	.141	.120	.142	.140
16	.012	.677	-.059	-.009
	.126	.131	.129	.125
17	.027	.116	.184	.532
	.112	.069	.104	.140
18	.160	.513	.090	.055
	.138	.130	.156	.153
19	.095	.200	.563	.253
	.132	.142	.133	.131
20	.432	.283	.079	-.048
	.112	.156	.155	.160
21	.071	.400	.224	-.057
	.129	.232	.234	.151
22	.571	.151	.174	.224
	.111	.127	.124	.141
23	.291	.211	.581	.236
	.131	.113	.134	.147
24	-.098	.586	.283	-.076
	.125	.129	.160	.139
25	.572	-.023	.115	-.055
	.110	.111	.142	.170
26	.236	.031	.456	.425
	.124	.122	.123	.130

27	.272	.071	.074	.058
	.168	.143	.215	.236
28	.608	-.035	.341	.133
	.113	.119	.124	.165
29	.076	-.085	.385	-.128
	.179	.111	.211	.202
30	.246	.314	.335	.260
	.117	.087	.107	.120
31	.263	.355	.051	.067
	.151	.113	.176	.189
32	.639	.047	.254	.046
	.107	.090	.094	.139
33	.534	.373	.033	.131
	.113	.083	.135	.132
34	.105	.006	.466	.149
	.150	.105	.177	.171
35	.159	.208	-.028	-.123
	.091	.264	.105	.154
36	.129	-.081	.296	.596
	.097	.115	.115	.126
37	.313	.149	.445	.159
	.139	.124	.156	.163
38	.143	.060	.049	.302
	.153	.113	.195	.186
39	.290	.106	.642	.200
	.125	.136	.104	.129
40	.147	.771	.031	-.059
	.108	.064	.109	.094
41	.107	.131	.553	.278
	.143	.159	.158	.160
42	.449	.259	.371	-.068
	.119	.155	.177	.159
43	.774	.114	.051	.058
	.064	.073	.118	.138
44	.261	-.007	.384	.408
	.119	.115	.132	.143
45	.202	.610	.065	.181
	.121	.103	.152	.155
46	.218	.573	.306	-.128
	.116	.135	.154	.127
47	.174	.181	.371	.000
	.124	.248	.246	.165
48	.091	-.022	.553	.333
	.136	.093	.146	.147
49	.169	-.039	.266	.563
	.140	.101	.131	.162
50	.516	.232	.035	.011
	.127	.108	.159	.145
51	.455	.316	.120	.219
	.110	.120	.154	.122
52	-.015	-.281	.283	.543
	.136	.086	.160	.140

APPENDIX B:
Bootstrap Structure for 100 Samples of Size n=200

1	.199	.073	.564	.363
	.090	.074	.103	.089
2	.272	.477	-.077	.251
	.094	.077	.091	.082
3	.047	-.105	.126	-.176
	.130	.058	.096	.160
4	.712	.173	.026	.131
	.050	.054	.072	.096
5	.211	.591	.261	-.098
	.085	.094	.142	.099
6	.612	.016	.290	.329
	.067	.074	.091	.099
7	.281	.003	.359	.086
	.107	.093	.127	.143
8	-.045	-.160	.354	.577
	.074	.064	.080	.081
9	.054	.515	.042	.101
	.089	.059	.104	.117
10	.042	.205	.451	-.021
	.087	.130	.125	.131
11	.127	.697	-.031	-.074
	.072	.067	.079	.075
12	.339	.195	-.028	.410
	.100	.122	.141	.143
13	.681	.019	.233	.095
	.069	.098	.108	.113
14	.082	.717	.061	.030
	.070	.084	.119	.095
15	.122	.440	.125	-.122
	.085	.096	.112	.119
16	-.014	.611	-.075	-.005
	.088	.118	.097	.073
17	.022	.117	.150	.573
	.070	.055	.091	.135
18	.173	.470	.080	.060
	.107	.108	.131	.113
19	.063	.217	.585	.260
	.097	.090	.103	.113
20	.430	.298	.069	-.042
	.082	.094	.117	.118
21	.090	.393	.262	-.097
	.085	.151	.145	.095
22	.583	.182	.154	.234
	.072	.084	.085	.092
23	.258	.186	.643	.202
	.081	.070	.092	.089
24	-.133	.572	.324	-.064
	.074	.097	.101	.096
25	.603	-.008	.136	-.075
	.070	.086	.085	.107
26	.236	.045	.436	.442
	.098	.076	.098	.104

27	.270	.100	.120	.018
	.102	.114	.160	.175
28	.619	-.046	.328	.135
	.082	.093	.117	.124
29	.107	-.096	.418	-.188
	.099	.078	.149	.147
30	.248	.296	.346	.235
	.087	.070	.104	.121
31	.248	.348	.063	.044
	.091	.087	.150	.154
32	.653	.043	.266	.027
	.062	.070	.073	.103
33	.560	.379	.012	.132
	.061	.054	.078	.083
34	.080	.055	.501	.131
	.113	.090	.129	.121
35	.149	.159	-.041	-.126
	.063	.191	.081	.099
36	.138	-.072	.273	.630
	.075	.090	.085	.116
37	.295	.101	.506	.129
	.098	.089	.105	.120
38	.127	.056	.038	.324
	.102	.096	.162	.160
39	.255	.103	.697	.185
	.090	.070	.070	.078
40	.143	.777	.047	-.060
	.070	.043	.081	.073
41	.079	.152	.550	.325
	.099	.103	.146	.133
42	.463	.192	.405	-.082
	.084	.127	.111	.110
43	.800	.099	.026	.076
	.050	.055	.080	.095
44	.283	-.010	.371	.396
	.104	.102	.109	.113
45	.194	.629	.050	.195
	.087	.056	.103	.105
46	.231	.537	.341	-.132
	.074	.108	.118	.084
47	.191	.121	.425	-.040
	.089	.179	.177	.130
48	.084	.014	.563	.322
	.073	.083	.108	.116
49	.160	-.076	.270	.609
	.083	.085	.095	.113
50	.549	.212	.013	.007
	.092	.081	.120	.114
51	.459	.290	.106	.233
	.076	.101	.121	.098
52	.002	-.296	.249	.574
	.087	.057	.108	.098

APPENDIX C:
Bootstrap Structure for 100 Samples of Size n=600

1	.186	.069	.568	.373
	.051	.039	.061	.049
2	.264	.483	-.092	.262
	.047	.047	.073	.071
3	.043	-.109	.135	-.177
	.072	.034	.071	.114
4	.719	.170	.013	.144
	.025	.030	.053	.058
5	.219	.594	.263	-.115
	.040	.051	.072	.057
6	.631	-.003	.288	.309
	.035	.046	.063	.052
7	.296	-.019	.351	.062
	.058	.055	.073	.090
8	-.057	-.152	.341	.611
	.040	.038	.059	.057
9	.036	.524	.021	.133
	.051	.032	.067	.072
10	.051	.186	.473	-.061
	.040	.075	.064	.066
11	.129	.708	-.033	-.073
	.037	.032	.045	.042
12	.340	.182	-.031	.419
	.065	.075	.119	.110
13	.702	.011	.233	.080
	.030	.054	.067	.057
14	.084	.716	.081	.013
	.037	.048	.069	.055
15	.109	.457	.096	-.090
	.049	.057	.073	.085
16	-.013	.638	-.080	.009
	.054	.063	.059	.045
17	.021	.133	.119	.619
	.040	.028	.053	.065
18	.154	.496	.060	.079
	.054	.063	.073	.065
19	.048	.206	.592	.252
	.048	.054	.057	.060
20	.426	.303	.060	-.023
	.050	.055	.067	.077
21	.080	.408	.276	-.103
	.047	.092	.101	.067
22	.580	.182	.158	.223
	.045	.047	.056	.055
23	.250	.184	.662	.187
	.046	.043	.057	.059
24	-.138	.572	.336	-.091
	.040	.051	.058	.048
25	.613	-.020	.151	-.107
	.035	.052	.059	.068
26	.230	.055	.434	.454
	.059	.043	.061	.062

27	.255	.103	.106	.038
	.070	.075	.101	.105
28	.645	-.072	.341	.094
	.040	.053	.066	.078
29	.095	-.096	.425	-.189
	.057	.048	.114	.105
30	.232	.311	.338	.265
	.050	.043	.053	.069
31	.254	.352	.041	.073
	.056	.050	.093	.085
32	.663	.030	.263	.021
	.038	.039	.041	.053
33	.566	.379	.000	.139
	.040	.030	.059	.057
34	.079	.038	.538	.102
	.061	.051	.063	.072
35	.162	.164	-.035	-.134
	.034	.109	.046	.054
36	.133	-.068	.256	.657
	.039	.042	.051	.057
37	.287	.104	.517	.137
	.059	.055	.081	.092
38	.119	.062	.040	.347
	.060	.055	.096	.101
39	.249	.089	.719	.166
	.048	.041	.049	.054
40	.142	.781	.043	-.067
	.041	.023	.044	.042
41	.082	.127	.587	.294
	.052	.065	.080	.077
42	.469	.197	.400	-.089
	.046	.076	.076	.082
43	.816	.093	.018	.074
	.021	.030	.053	.060
44	.282	-.009	.375	.399
	.054	.059	.064	.074
45	.194	.633	.035	.213
	.047	.030	.059	.062
46	.224	.548	.340	-.147
	.046	.063	.063	.048
47	.184	.149	.417	-.038
	.045	.105	.117	.091
48	.082	.006	.570	.325
	.047	.045	.062	.064
49	.149	-.065	.250	.647
	.042	.051	.054	.066
50	.547	.219	-.012	.021
	.047	.052	.078	.077
51	.457	.306	.100	.234
	.046	.053	.062	.053
52	-.016	-.283	.227	.607
	.055	.033	.084	.063